B. WFA-LL Access Technology

Code Division Multiple Access (CDMA) is an advantageous access technology for WFA-LL service as it increases spectrum efficiency and the number of potential system users. CDMA has long been used in military application for secure communications. In the past few years, it has become a viable, cost-effective technology for commercial use in the public sector. In brief, CDMA is a wideband, spread spectrum technology that spreads multiple conversations across a wide segment of spectrum. Each user channel is assigned a unique code that distinguishes it from all other user channels being transmitted simultaneously within the same spectrum. Receiving devices pick the proper user channels via the assigned codes. Using a form of CDMA known as orthogonal CDMA, DSC currently can achieve 15 user conversations per 3.5 MHz channel. Future product releases will deliver much higher concentration ratios.

The choice of CDMA for WFA-LL service is particularly prudent. CDMA has several natural strengths over other radio technologies: it is highly resistant to interception and eavesdropping, it is highly resistant to the theft of service, and it is also typically more resistant to interference from other radio sources. In addition, a high spectral efficiency can be achieved with CDMA systems that significantly exceeds that of most other technologies. For example, DSC's proposed design can theoretically achieve 0.617 Mbits/MHz. This spectral efficiency is critical to the effective utilization of scarce radio spectrum. Increased resistance to interference and higher spectral efficiency provide a more robust channel that supports higher quality voice and the higher data rates required for enhanced services such as fax, data, and ISDN.

Also, the fact that separate traffic bearing channels are coded into the same frequency channel enables very efficient and flexible multiplexing of channels to deliver a wide range of bandwidth to the customer. This multiplexing enables the cost effective implementation of multichannel customer terminals, which can be used to deliver services ranging from multiple voice lines to ISDN data, potentially on a call-by-call basis.

C. WFA-LL Channelization Scheme

DSC believes that an optimally designed WFA-LL system will use frequency division duplexing (FDD), requiring up to 12 uplink/downlink (duplex) RF channels to achieve maximum deployment capacity in a multi-cell system with contiguous cell coverage and frequency reuse over a wide area. The channelization required is typically 3.5 MHz using CDMA to allow the transmission of multiple (currently 15) bi-directional radio links within each duplex RF channel. This block of RF channels is defined by the system RF filters, which need to be physically changed, resulting in a different equipment version, if the system is to work in another 12 channel block. Selection of RF channels within a 12 channel block is fully synthesized.[8] This sample channelization scheme is consistent with ITU-R Recommendation 1098 and CEPT recommendations (see Appendix B).[9]

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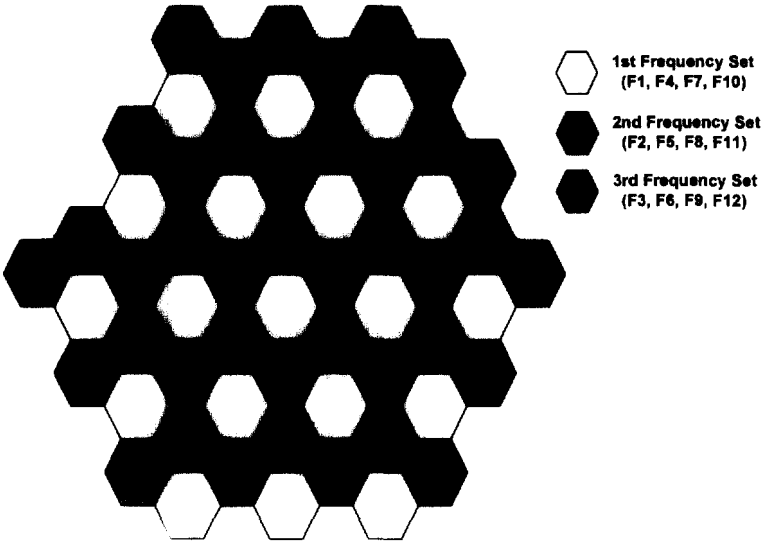
[8] Channel plans of less than 12 channels can be supported. In general, WFA-LL system costs will increase and there will exist the potential for more co-channel or adjacent channel interference as a result of more frequent frequency reuse.

[9] Every effort is made to adhere to ITU-R and CEPT channelization schemes and duplex spacings. Where strict adherence is not possible, duplex channel spacings are required to be between 55 MHz and 250 MHz.

In a multi-cell system, with 12 RF channels available for the uplink and for the downlink, a total of 84 MHz of spectrum would be required (42 MHz for the uplink and 42 MHz for the downlink). Using 4 RF channels per cell and a 3 cell repeat pattern, a well-designed, wide-area WFA-LL system can easily be deployed. An example of a WFA-LL system with this configuration is shown below.



Simplified View of the Central Terminal Cell Deployment

IV. WFA-LL SPECTRUM REQUIREMENTS

A. Frequency Allocations (1.3 - 2.7 GHz)

The use and application of radio frequency bands are defined by international regulations and by regional and country-specific spectrum management authorities, defining the fundamental way in which an area of RF spectrum is used. Each frequency band can be subdivided into varying numbers of uplink/downlink RF channels with varying bandwidths. Channel plans are therefore country, and even license, specific. An example of the latter would be broadband PCS in the United States where licensees are free to deploy a channelization scheme of their own choosing in a 10 or 30 MHz block.

As is being proposed, spectrum between 1.3 and 2.7 GHz (more specifically, spectrum between 1.3 and 1.85 GHz or 1.99 and 2.7 GHz so as to avoid the US PCS spectrum) should be used for WFA-LL services. The choice of this spectrum has a historical basis. In the past, the radio spectrum between 1.3 and 2.7 GHz has been used for a variety of applications, especially microwave point-to-point radio links. In many countries, these radio links have now been totally or partially taken out of service and replaced with optical fiber systems and/or digital point-to-point radio links, which generally operate in spectrum above 3 GHz. This shift in technology is gradually freeing up spectrum below 3 GHz for new radio-based services such as WFA-LL service. Thus, many manufacturers, including DSC, have designed equipment for operation in much or all of the 1.3 - 2.7 GHz range.

In addition to the replacement/relocation of microwave point-to-point radio links, the use of frequency bands between 1.3 and 1.85 GHz or 1.99 and 2.7 GHz has other distinct advantages for WFA-LL system operation, including the following:

- Avoidance of bands normally used for mobile cellular system operation

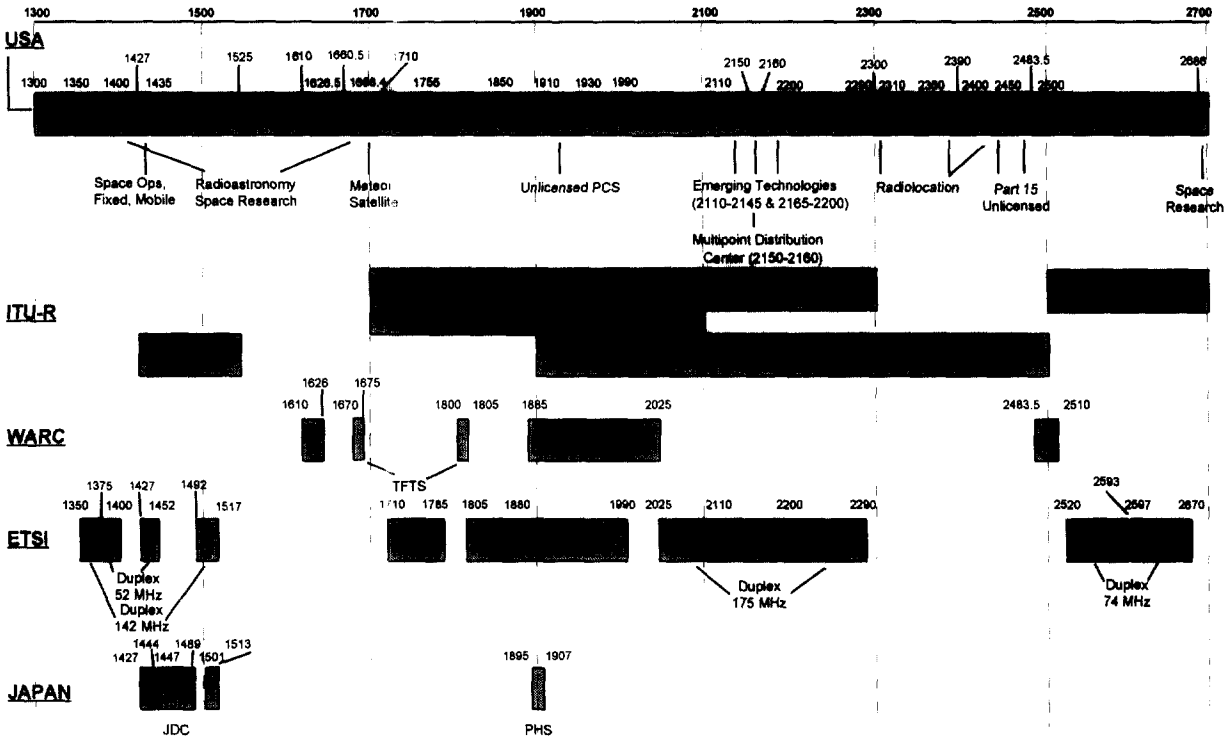
  The frequency bands below 1 GHz are normally allocated for cellular and other mobile services. In the United States, as in many other countries, these bands are becoming very congested, especially in the urban areas. This congestion is causing cellular operators to seek additional spectrum around 1.85 - 1.99 GHz (US PCS). Cellular/PCS systems are restricted to operation in these pre-assigned bands with standard air-interfaces to ensure handset compatibility.

- Excellent balance of cell size and radio coverage versus network deployment costs

  The 2 GHz frequency band is a practical band of operation for fixed WLL systems in terms of the achievable cell size, radio coverage or penetration within a cell, and immunity to rainfall or fog attenuation. The use of higher frequency bands (> 3 GHz) would significantly reduce both the radio coverage as a function of power and rainfall immunity. Concomitantly, at higher frequencies, smaller cells would need to be deployed to cover a target end-user population, increasing the overall WFA-LL network deployment costs. Higher frequencies would also require communications to be more point-to-point in nature, further increasing costs.

Use of the 2 GHz frequency range for public services (e.g. WFA-LL services) is consistent with both short and long term initiatives being instigated by international organizations such as the International Telecommunications Union (Radio) (ITU-R) and the World Administrative Radio Council (WARC) to produce harmonized frequency allocation plans throughout the world. In addition, other organizations, such as the European Conference of Postal and Telecommunications Administrations (CEPT) (a branch of the European Telecommunication Standards Institute (ETSI) serving approximately 45 Western and Eastern European countries) and the FCC, work on regional/national bases to achieve frequency/channel plan

harmonization for the same services in specific geographic regions. In fact, CEPT and FCC inputs are often used by the ITU-R[10] in the formulation of ITU-R Recommendations or Reports. Although the efforts and long term goals of all these organizations may be the same, global frequency harmonization will take many years to achieve. The Figure below shows the current proposed usage of the 1.3 to 2.7 GHz bands by several of these frequency management organizations.



Spectrum Allocations 1.3 - 2.7 GHz

[10] A more detailed discussion of ITU-R/CEPT frequency allocations is provided in Appendix B.

Considering all of these points, any WFA-LL system designed to operate in these frequency bands will need to operate on channel plans following the guidelines established by the various international organizations.

Finally, to the extent the United States allocates spectrum within the 2 GHz band for WLL, it will stimulate the market for US-manufactured WLL equipment and help to ensure that companies manufacturing for the US market are able to sell their equipment internationally.

V. WFA-LL System Deployment in the U.S. at "2 GHz"

As discussed previously, the WFA-LL systems must be capable of being deployed within a variety of frequency bands and a number of different channel plans due to the incongruity of international spectrum management (albeit virtually all allocation plans call for operation in the 1.3 - 2.7 GHz band). Deployment within the existing US PCS A, B, or C 30 MHz blocks is theoretically possible with the corresponding reduction of 3.5 MHz channels from the proposed number of 12 to 4.[11] Due to the reduction of channels per cell, the overall system cost will increase as many more cells are needed to cover the subscriber base. This economic limitation is of such significant value that it is proposed that the WFA-LL solution be deployed at alternate frequencies with a larger spectrum allocation. Satisfaction of these conditions will allow WFA-LL service to be deployed in optimal configurations.

A. Potential WFA-LL Channel Plan A

In surveying the present FCC/NTIA spectrum allocations between 1.3 and 1.85 GHz, it is noted that the spectrum between 1710 - 1755 MHz, allocated for exclusive "Government Fixed and Mobile" services is being scheduled for reallocation[12] for exclusive non-government use in the 25 largest US cities by January 1999 with national usage completed

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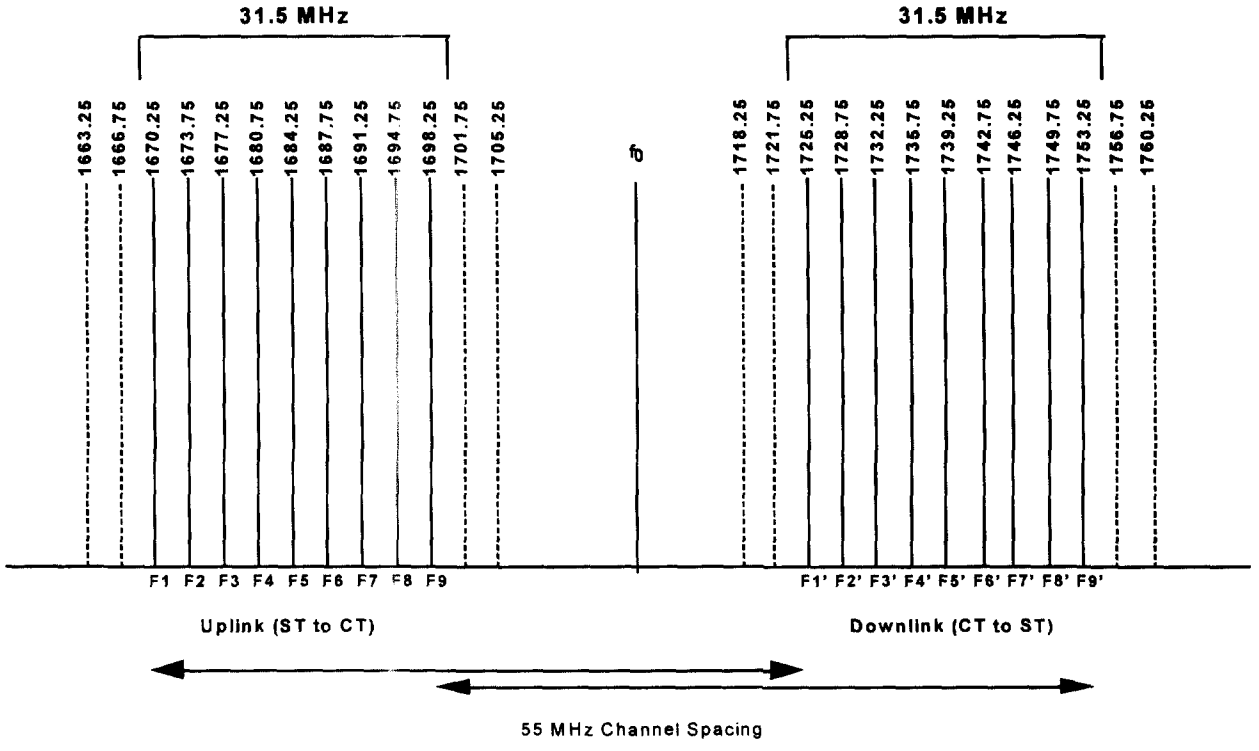
[11] To that end, DSC supports the FCC initiative to allow Commercial Mobile Radio Service ("CMRS") providers to use their spectrum to provide WLL service. However, it should be noted that to achieve 4 duplex channels, A, B, & C-Block PCS licensees would need to dedicate their nearly all of their frequency block to WLL.

[12] Plan for Reallocated Spectrum, released March 22, 1996, FCC 96-125.

in 2004. The adjacent band, 1668.4 - 1710 MHz, is presently shared between government and non-government users for radiolocation (primary) and meteorological aids. Allocation of portions of these spectra, on a co-primary basis, would allow for the introduction of a WFA-LL channel plan with a complement of nine pairs of 3.5 MHz channels. With the appropriate status and license negotiations, US WFA-LL Channel Plan (Plan A, shown below) can be deployed with 9 uplink channels at 1668.5 - 1700.0 MHz paired with 9 downlink channels at 1723.5 - 1755.0 MHz. The duplex spacing will be 55 MHz.[13]



Potential WFA-LL Channel Plan A

[13] All proposed channel plans may be subject to minor variations due to changes in final selection of center frequency

In surveying the present FCC/NTIA spectrum allocations between 1.99 and 2.7 GHz, it appears that there are several possibilities for spectrum allocations for WFA-LL. In most cases, the spectrum would need to be allocated (as it already) on a co-primary basis. In addition, several of these potential WFA-LL bands are in states of possible reallocation due to service relocations and/or service redefinition. The frequency bands of interest are 2025 - 2110 MHz, 2110 - 2150 MHz, 2160 - 2200 MHz, 2310 - 2360 MHz, 2400 - 2450 MHz, and 2450 - 2483.5 MHz. Descriptions of the uses of these bands are as follows:

- 2025 - 2110 MHz - This spectrum is a sub-band of 1990 - 2110 MHz. The entire spectrum is labeled "non-government exclusive" and is used for a variety of Fixed and Mobile services, including Broadcast Auxiliary Service and Electronic News Gathering.
- 2110 - 2150 MHz - This spectrum is labeled "non-government exclusive" and is used for a variety of Fixed and Mobile services. Fixed microwave services in this spectrum are paired with the 2160 - 2200 MHz allocation. The spectrum has also been slated for use by "Emerging Technologies". In addition, this spectrum is being discussed for relocation of microwave licensees from 1990 - 2025 MHz.
- 2160 - 2200 MHz - This spectrum is labeled "non-government exclusive" and is used for a variety of Fixed and Mobile services. Fixed microwave services in this spectrum are paired with the 2110 - 2110 MHz allocation. The spectrum has also been slated for use by "Emerging Technologies". In addition, this spectrum is being discussed for the geostationary orbit MSS downlink.

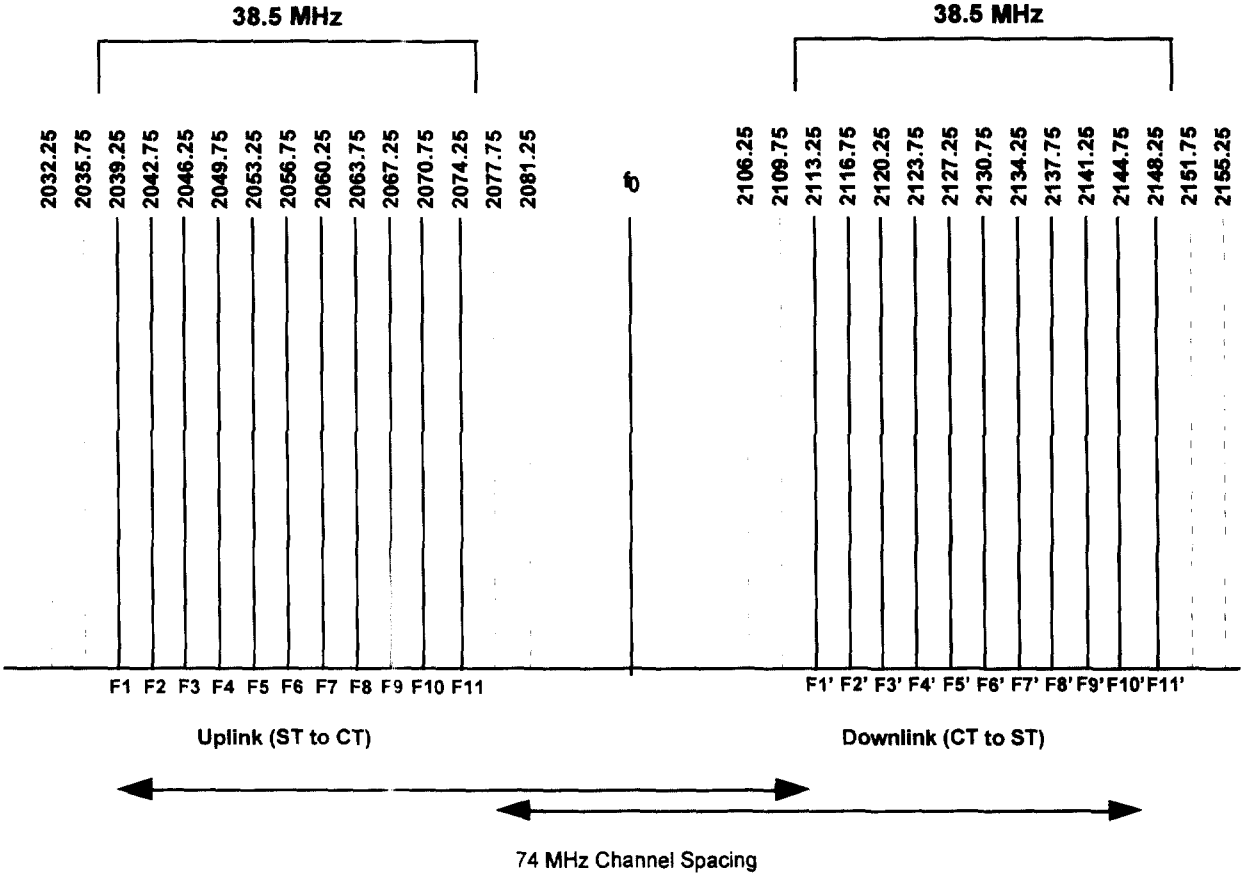
- 2310 - 2360 MHz - This spectrum is shared amongst government and non-government users. Primary status is held by "non-government exclusive" Broadcast Satellite. The FCC has recently allocated this spectrum for satellite digital audio broadcasting to conform with 1992-WARC allocations, however, it is unclear if the total 50 MHz will be granted.
- 2400 - 2450 MHz - This spectrum is shared amongst government and non-government users. Government radiolocation, amateurs, and Part 15 unlicensed devices operate in this spectrum.

Potential channel plans using the above frequency bands are developed over the next several pages.

Other spectrum allocations, as determined by the FCC, may be equally suitable for WFA-LL service.

B. Potential WFA-LL Channel Plan B

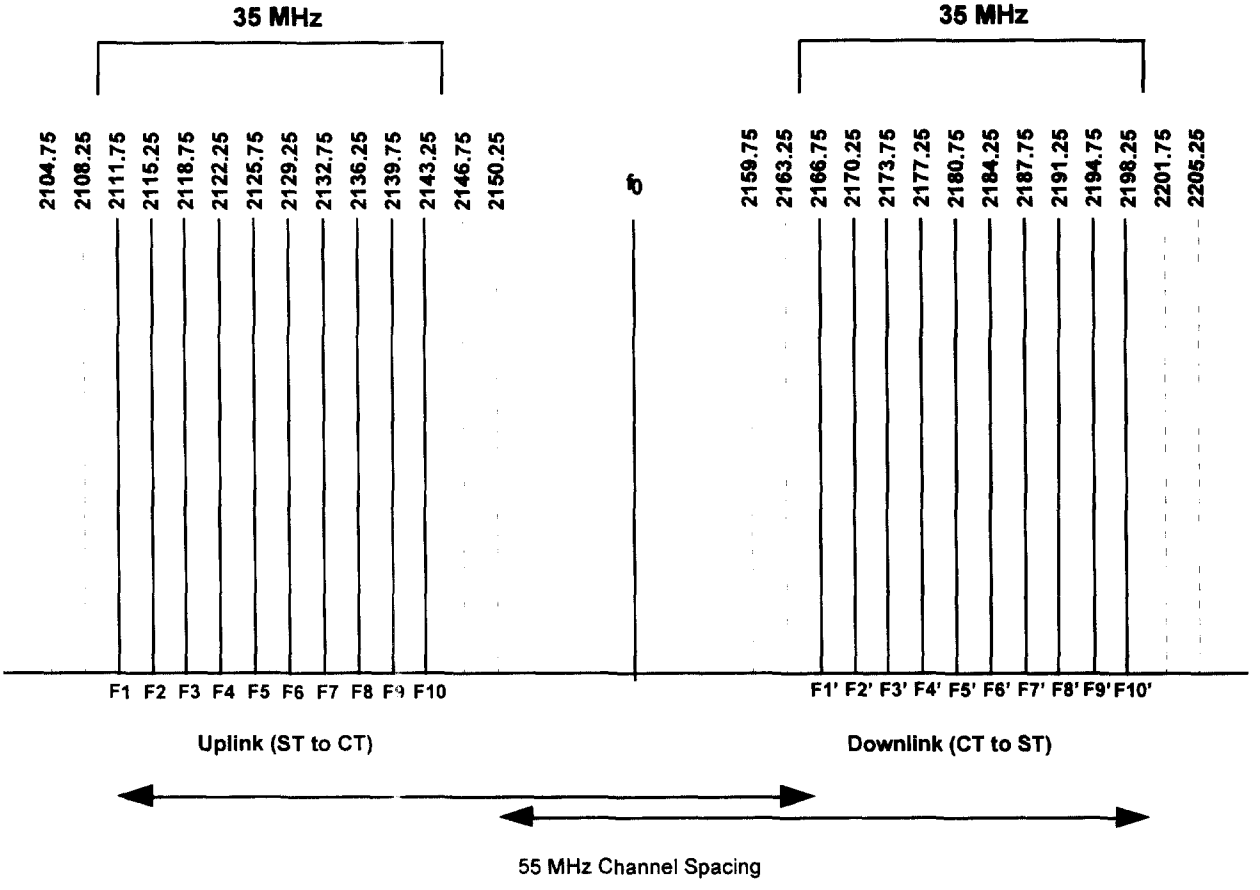
Potential Channel Plan B (shown below) uses the 2025 - 2110 MHz spectrum paired with the 2110 - 2150 spectrum. This channel plan would consist of 11 uplink channels at 2037.5 - 2076.0 MHz paired with 11 downlink channels at 2111.5 - 2150.0 MHz. Duplex channel spacing is consistent with CEPT spacing at 74 MHz.



Potential WFA-LL Channel Plan B

C. Potential WFA-LL Channel Plan C

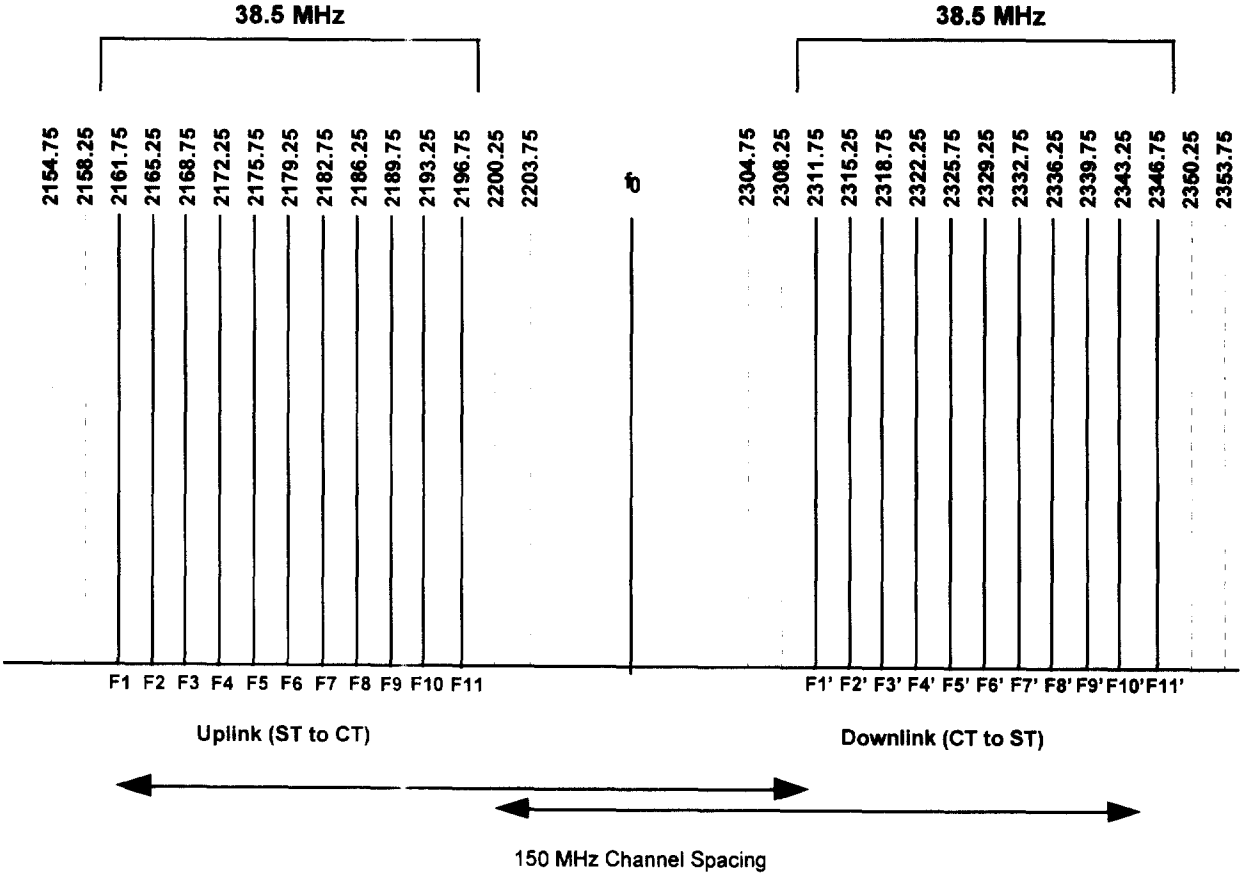
Potential Channel Plan C (shown below) uses the 2110 - 2150 MHz spectrum paired with the 2160 - 2200 spectrum. This channel plan would consist of 10 uplink channels at 2110.5 - 2145.0 MHz paired with 10 downlink channels at 2165.0 - 2200.0 MHz. Duplex channel spacing is 55 MHz.



Potential WFA-LL Channel Plan C

D. Potential WFA-LL Channel Plan D

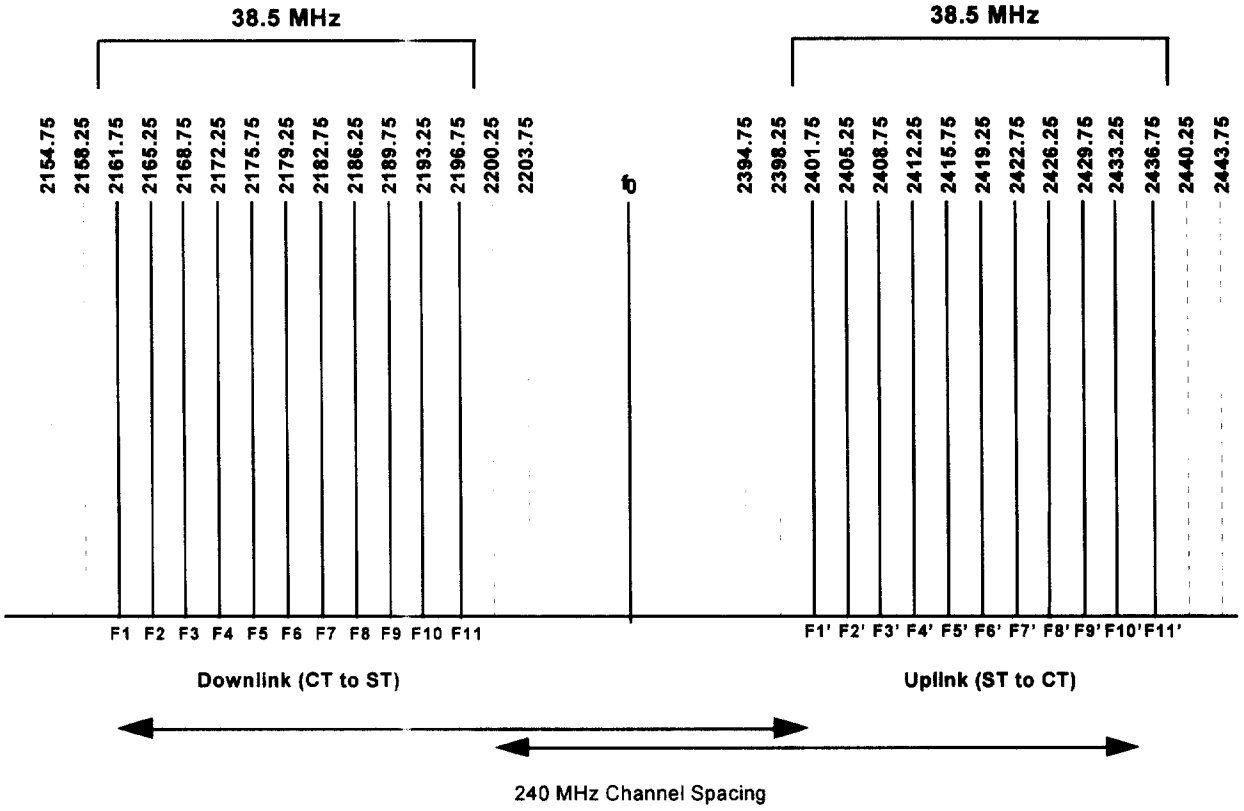
Potential Channel Plan D (shown below) uses the 2160 - 2200 MHz spectrum paired with the 2310 - 2360 spectrum. This channel plan would consist of 11 uplink channels at 2160.0 - 2198.5 MHz paired with 11 downlink channels at 2310.0 - 2348.5 MHz. Duplex channel spacing is 150 MHz.



Potential WFA-LL Channel Plan D

E. Potential WFA-LL Channel Plan E

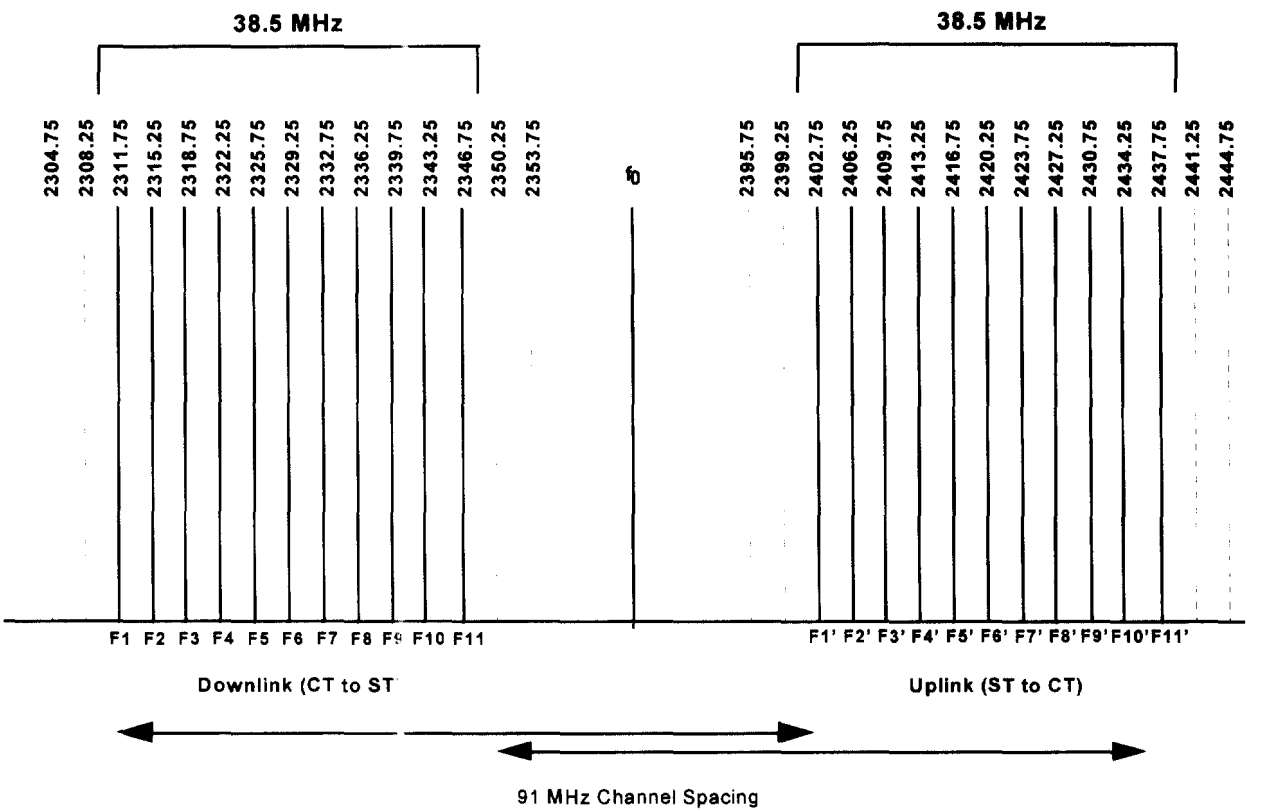
Potential Channel Plan E (shown below) uses the 2160 - 2200 MHz spectrum paired with the 2400 - 2450 spectrum. This channel plan would consist of 11 uplink channels at 2400.0 - 2438.5 MHz paired with 11 downlink channels at 2160.0 - 2198.5 MHz. The reversal of uplink and downlink bands locates the lower power (0.5 Watt) ST transmission in the spectrum with unlicensed devices. Duplex channel spacing is 240 MHz.



Potential WFA-LL Channel Plan E

F. Potential WFA-LL Channel Plan F

Potential Channel Plan F (shown below) uses the 2310 - 2360 MHz spectrum paired with the 2400 - 2450 spectrum. This channel plan would consist of 11 uplink channels at 2401.0 - 2439.5 MHz paired with 11 downlink channels at 2310.0 - 2346.75 MHz. As in Channel Plan E, the reversal of uplink and downlink bands locates the lower power (0.5 Watt) ST transmission in the spectrum with unlicensed devices. Duplex channel spacing is consistent with CEPT spacing at 91 MHz.



Potential WFA-LL Channel Plan F

VI. Rules and Policies for WFA-LL Service

A. Licensing Rules

1. Number of licensees

The number of licensees per geographic licensing area is clearly dependent upon the amount of spectrum allocated for this service. In the event that spectrum is granted in the amounts proposed in the potential channel plans in the previous section, then spectrum allocated for WFA-LL service should be licensed to one applicant per geographic licensing area. If more spectrum becomes available, then two licensees can be accommodated per licensing area. While only one licensee would not allow "wireless" competition in the local loop, the real competition is with "wireline" providers. A single, economically-viable wireless competitor would greatly enhance competition in the local exchange marketplace. Also, unless ample spectrum is available for (re)allocation, granting licenses to more than one applicant per licensing area would not be in the public interest as each licensee would be less likely to have sufficient spectrum to offer a reliable and economically viable local loop service at any level.

2. Licensing areas

In order to maximize the efficient use of this spectrum, it should be licensed on a geographic basis that comports best with the provision of local exchange services. While no exact division of the country exists for this purpose, DSC submits that licensing on an MSA and RSA basis would be appropriate. MSA- and RSA-wide licenses would facilitate the development of local services and would also promote the integration of mobile (*i.e.*, cellular)

services with fixed local services in "one-stop shopping" packages for which there is an increasing demand. A less desirable, but still acceptable, alternative would be to license WFA-LL licenses on a Basic Trading Area (BTA) basis, making them geographically coterminous with PCS licenses in the C, D, E, and F blocks. As mobile services from PCS licensees become established, licensing on a BTA basis would again promote the "one-stop shopping" concept.

3. Use of auctions

WFA-LL licenses, in the case of mutually exclusive applications, should be awarded through competitive bidding. WFA-LL authorization would clearly qualify for auctions as the service will involve compensation by subscribers and will enable subscribers to communicate through transmissions over the frequencies involved.[14] At this time, DSC does not have any specific proposals for the auction rules, save to observe the success of simultaneous auctions used for PCS licensing. WFA-LL licenses should be auctioned in a like manner as potential applicants are likely to perceive considerable interdependence among the licenses and can be expected to endeavor to bid in a way that maximizes their opportunity to construct statewide or regional networks.

4. Regulatory treatment.

DSC envisions that WFA-LL service, as a substitute for local exchange services, would be regulated as a common carrier service subject to Title II of the Communications Act of 1934, as amended. More specifically, DSC contemplates that WFA-

[14] 47 U.S.C. § 309(j)(2).

LL licensees will use their spectrum to support the provision of competitive local exchange and access services. In other words, WFA-LL licensees would be "local exchange carriers" under Section 251 of the Act and would be subject to the obligations imposed on local exchange carriers under Section 251(b), as added by the Telecommunications Act of 1996. As such, the states would be preempted from any entry, rate, or other regulation of WFA-LL licensees, except as permitted under Section 253 of the Act.

B. Technical Rules

The technical rules applicable to WFA-LL operations should maximize licensee flexibility, while ensuring that licensees in adjacent geographic areas and in adjacent frequency blocks are adequately protected. In addition, where coexistence with other services is required, the appropriate technical rules will need to be modified to ensure adequate protections for all involved services. As a general guideline, the nature and scope (although not necessarily the specifics) of the Commission's technical rules for broadband PCS provide an appropriate model.[15]

Within their spectrum block assignments, WFA-LL licensees should be free to adopt whatever channelization scheme they see fit. There should be no limits on effective radiated power or antenna height provided that at the boundary of WFA-LL licensing areas, WFA-LL licensees ensure that the predicted and measured median field strength does not exceed 47

[15] 47 C.F.R. §§ 24.232-24.238.

dBuV/m.[16] However, parties in adjacent licensing areas should be permitted to agree to a different field strength limit at the common boundary if they choose.

To protect licensees in adjacent spectrum blocks, WFA-LL licensees would be required to attenuate the power outside their frequency block below the transmitter output power (P) by at least 45 dB at $f_0 \pm$ (2.5 x the channel bandwidth). No frequency stability requirement should be required provided that the fundamental emission stays within the frequency block and the attenuation limits are met.

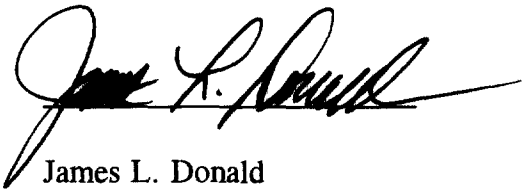
[16] 47 C.F.R. § 236. DSC is proposing that the same field strength limits specified for PCS be used for WFA-LL service.

VII. CONCLUSION

For the foregoing reasons, the FCC should issue a notice of proposed rulemaking to amend the table of frequency allocations to provide spectrum for a wireless fixed access local loop service. In addition, the Commission should adopt service and licensing rules that promote the development in the reallocated spectrum of true wireless alternatives to the copper- and fiber-based local loops of the incumbent local exchange carriers. The public interest would benefit from such action, which would increase local service competition yielding lower prices and increased diversity in services and service providers.

Respectfully submitted,

DSC COMMUNICATIONS CORPORATION

By: 

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June 4, 1996

VIII. Appendix A

Northern Business Information "Global Wireless Local Loop Markets: 1995 Edition" Exhibit 3-6: Selected Wireless Local Loop Implementations: Commercial Implementations and Market Trials

Country	Operator	Supplier	Technology	Planned Subscribers	Start-up	Status
Argentina	CTI	AT&T/Stanilite	WSS/AMPS	NA	1994	Commercial
Benin	OPT	Motorola	WiLL	500	1995-96	Trial
Brazil	Telebras companies	Ericsson, AT&T	AMPS Fixed	NA	1993	Commercial
		Nortel, NEC	Cellular			
		Motorola				
	Telerj	HNS	E-TDMA	18,000	1995	Trial
Cambodia	Camshin Company	Nokia	NMT - 450i	5,000	1993	Commercial
Central African Rep.	SOCATEL	Motorola	NAMPS WiLL	NA	1995	Commercial
China	Pearl River Telecom	Ericsson	RAS 1000	NA	1995	Trial
Colombia	Telecom Colombia	Motorola	TACS WiLL	2,000	1995	Commercial
	Pro-Subachoque carrier	Motorola	TACS WiLL	700	1995	Commercial
	4 regional operators	Ericsson	RAS 1000	NA	1994	Commercial
Czech Republic	SPT Telecom	HNS	E-TDMA	50, 000 YE96	1995	YE 1995
	SPT Telecom	Ericsson	DECT	NA	1996	Trial
		Siemens				
Estonia	Estonia Telephone Co.	Ericsson	RAS 1000	NA	1994	Commercial
France	CGE	Alcatel	DECT	NA	1994	Trial
Finland	Telecom Finland	Nortel	Ionica FRA	NA	early 1996	In deployment
	Heisinki Tele Co.	Ericsson	DECT		1994	Commercial
Germany	Deutsche Telekom	Ericsson/Nokia	NMT Fixed	45000	1991-92	Commercial
			Cellular			
	RWE Telliance	Ericsson	DECT	NA	1996	Trial

(Continued)

Exhibit 3-6 (continued)
Selected Wireless Local Loop.Implementations: Commercial Implementations and Market Trials

Country	Operator	Supplier	Technology	Planned Subscribers	Start-up	Status
Ghana	Ghana P&T	Motorola	TACS WiLL	NA	1994	Commercial
Hungary	MATAV	Motorola	TACS WiLL	NA	1995	YE1995
	MATV	Ericsson	RAS 1000	10,000	1994	Commercial
	JaszTel (regional carrier)	Ericsson	RAS 1000	NA	1994	Commercial
Indonesia	PT Ratelindo	HNS	E-TDMA	50,000 YE95	1995	Commercial
	PT Telkom	Ericsson	DECT	4,000	1995-96	Trial
Japan	NTT Personal	NEC/Fujitsu	PHS	NA	1995	Commercial
	DDI Pocket	NEC/Fujitsu	PHS	NA	1995	Commercial
	Astel	NEC/Fujitsu	PHS	NA	1995	Commercial
Lithuania	OmniTel	Motorola	GSM WiLL	NA	1995-96	In deployment
Malawi	Malawi P&T	HNS	E-TDMA	12,000	1995	Commercial
Malaysia	Telekom Malaysia	Ericsson	RAS 1000	70,000 YE95	1994	Commercial
	STW	Ericsson	AMPS/TDMA	40,000 YE95	1994	Commercial
			Fixed Cellular			
Mexico	IUSATEL	Nortel	TDMA FRA	2,000	1994-95	Trial
			450 MHz			
Mexico	TELMEX	Ericsson	RAS 1000	NA	1993-94	Trial
Nigeria	Nigerian Telecom	Motorola	NAMPS WiLL	NA	YE 1995	Commercial
Norway	Telenor	Ericsson	DECT	NA	1994-95	Trial
Philippines	PLDT	InterDigital	TDMA	NA	1995-96	Commercial
	Smart Communications	Ericsson	DECT	NA	1995-96	Trial

(Continued)

Exhibit 3-6 (continued)
Selected Wireless Local Loop Implementations: Commercial Implementations and Market Trials

Country	Operator	Supplier	Technology	Planned Subscribers	Start-up	Status
Russian Federation						
Tatarstan	TATINCOM	HNS	E-TDMA	30,000	1995	Commercial
Krasnodar	NA	HNS	E-TDMA	2,5000	1994	Trial
Novorossiysk	NA	HNS	E-TDMA	5,000	1994	Trial
Vladivostok	NA	HNS	E-TDMA	2,000	1994	Trial
Chebokasary	Chuvashia Mobile	AT&T	AMPS WSS	1,000	1995	Commercial
Voronezh	Vostok Mobile	AT&T	AMPT WSS	NA	1995	Commercial
Lipetsk	Unicell	AT&T	AMPS WSS	NA	1995	Commercial
Various cities	NA	Ericcson	NMT-450i	NA	1991-95	Commercial
Spain	Telefonica Moviles	Motorola	Fixed cellular	400,000 YE96	1992-96	Commercial
Sri Lanka	SLT	Motorola	NAMPS WiLL	10,000	1995	Commercial
United Kingdom	Ionica	Nortel	Ionica FRA	NA	1996	Trial
	BT	DSC	B-CDMA	NA	1995-96	Trial
United States	SBC Communications	Motorola	PACS	NA	1995	Trial
Uzbekistan	Uzdunrobita	Nortel	TDMA	NA	1994-95	Trial
	Ministry of Comm.	DSC	Broadband CDMA	NA	1995	Trial
Vietnam	DGPT	HNS/NEC	E-TDMA	20,000	1995-96	Trial
	DGPT		TDMA FRA	NA	1995-96	Trial
			450 MHz			

IX. APPENDIX B

The plans detailed below are based on latest known published information by the ITU. A summary of frequency plans is provided in the latest Draft Revision of Recommendation ITU-R F.746. This recommendation is titled "Radio Frequency Channel Arrangements for Radio Relay Systems". An extract of the summary table showing all possible variants from 1.5 to 3 GHz is given below.

Band (GHz)	Frequency Range (GHz)	Recommendation ITU-R F-Series	Channel Spacing (MHz)
1.5	1.427 - 1.53	746 Annex 1	0.5; 1; 2; 3.5
2	1.427-2.69	701	0.5; (pattern)
2	1.7-2.1; 1.9-2.3	382	29
2	1.7-2.3	283	14
2	1.9-2.3	1098	3.5; 2.5 (patterns)
2	1.9-2.3	1098, Annexes 1,2	14
2	1.9 - 2.3	1098, Annexes 3	10
2	2.3 - 2.5	746 Annex 2	1; 2; 4; 14; 28
2	2.5 - 2.7	283	14

In some cases the frequency plans detailed are in the process of adoption, change or publication. In these cases, where known, the new number has also been included. At present there are no specific channel plans for Point-to-Multipoint ("P-M-P") radio access systems with only a single Recommendation Rec. 701 providing a general principle for co-ordination with fixed link allocations.

A. ITU-R Rec. 701

This recommendation covers point to multipoint (P-M-P) systems and in turn refers to other ITU-R recommendations. The general principle of this recommendation is that P-M-P systems should use the same basic parameters as fixed allocations in terms of duplex spacing and center frequency. Within these limits a basic channel spacing of 500 kHz is used to divide the whole band. These 500 kHz spaced channels can then be used in multiples to interleave or to fit around allocations for existing fixed systems.

The formula for calculating individual 500 kHz channels is:

$$F_n = F_o \times 0.5\ n$$

Where: n is an integer value depending on the total available frequency band

F_o is the reference center frequency for the band in question.

The intention of this Recommendation is to provide a basic frequency pattern. Duplex spacing for individual plans is determined either by existing systems or by other ITU-R Recommendations.